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a magazine for Shooters by Shooters

Precision SHOOTING

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COVER PHOTO

Shooters who fired 1600 possible scores at the Los Angeles Rifle and Revolver Club's Pacific States Fall Round-Up smallbore rifle tournament the weekend of November 6-7. Left to right standing are William T. (Bill) Atkinson, Vic Auer, Henry W. Benson and Bob Perkins. Kneeling are Capt. Lones W. Wigger, Jr., Herb Hollister and Tom Guerin. Photo by Carl Knight.

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REPRINTS of the articles dealing with bench rest shooting are available from Precision Shooting at the following post paid prices: "Conditions" by Dr. Sam Nadler 25¢. "Precision Mechanical Rest Systems" by A. H. Angerman 40¢. "Bench Rest Shooting From Sand Bag Rests" by Ed Shilen 25¢.

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A TIME FOR CAUTION MAY BE APPROACHING

Since present-day competitive bench rest shooting has had a national organization to govern the sport, provide shooting programs, adopt uniform rules, supervise registered tournaments and recognize record small groups and aggregates, all official records made in the United States have generally been claimed to be "World Records." In the past and even at present those "World Records" claimed have probably been justified, but that may not be true in the future and that future time may be approaching faster than most U. S. benchresters may realize.

So far as is known, no other nation has had an organization to provide and govern a competitive bench rest shooting program on a national scale. Other than for some individual shooters using the bench rest for test shooting, bench rest shooting has not until quite recently gained much headway in the rest of the world. But now there is pretty solid indication that Australia is emerging as a competiitve bench rest shooting nation. The sources of our Australian shooting information have been; first some correspondence with a few individual shooters, and for several years now the regular reading of Australian Outdoors and Shooting periodicals.

There are now two all-shooting periodicals published in Australia; the Sporting Shooter, published by a Sydney Publishing Company, and the Sporting Shooters' Journal, published monthly by the relatively young National Sporting Shooters' Association of Australia at Brisbane. These two organizations have been instrumental in greatly increasing the interest in bench rest shooting in their country in very recent years.

The Sporting Shooter is now in its fourth year of publication. It began as a bi-monthly publication but has rather recently gone to once a month publication. Not long after it began publication the magazine inaugurated a shooting program whereby targets were fired on home ranges, before witnesses, and qualifying targets forwarded to the magazine department for judging. Guns were limited to sporting rifles of any caliber, not over 10 pounds weight (including scope sight if used) and scope of not over 6 power. At first, to win a recognition award, a group fired at 100 yards was required to have 10 shots within a one inch square (two inch square at 200 yards, etc.). Later a "super-minute" group award was established which required 10 shots within a one inch circle when fired at 100 yard range. Photographs of qualifying targets are published in each issue of the magazine. Most of the qualifying groups are fired from bench rest but a few are shot from the prone position.

This program quickly won widespread popularity among riflemen. It also won active and generous cooperation from the shooting goods trade which supplied valuable merchandise for various prize awards. Presently prize awards are made for best target of the month, best target for the year, and most recently for most consistent shooter. The program has been expanded to include pistol shooting and, most recently, offhand shooting with .22 cal. rimfire rifles. However, the magazine has not, as yet, attempted to promote shoulder-to-shoulder competition and would probably not find this feasible.

The National Sporting Shooters' Association of Australia is a relatively young but growing membership organization of sporting shooters; rifle, pistol and shotgun. The first copy of their Journal that I have is Vol. 1, No. 4 which was published in June 1963 (I have received all issues published since then). The organization is set up on a representative system of national, state and local club units. Activities of the Association are not limited to target shooting but include all aspects of sport shooting, plus public relations, especially favorable relations between hunter shooters and land owners. But state and local chapters do conduct regular shoulder-to-shoulder shooting meetings, usually for the several types of sporting guns. At very nearly all of these meetings there are several events for shooting rifles from bench rest.

What the foregoing leads up to is an announcement in the October National Sporting Shooters' Journal that the first National Bench Rest Championships would be conducted on all S. S. A. A. Rifle Ranges between November 13th and November 21st, 1965. The competition to be for three classes of rifles; Sporter, Varmint and Open Benchrest. Specifications for the Open Bench Rest rifles are identical to those for the same class in the U. S. For Varmint Rifles the maximum weight is 14 lbs. and maximum scope power 12X. Maximum weight for Sporter Rifles is 10 lbs. and maximum scope power 6X. There are no caliber restrictions for Sporter Rifles—.22 caliber rifles are used very extensively for hunting in Australia. The championship aggregates are **two** 5-shot matches at each 100 and 200 yards for the Sporter and Varmint classes and **two** 10-shot matches at each 100 and 200 yards for Open Bench-Rest class. When we learn the results of these competitions (probably not until we receive the December Journal sometime in February) we will pass the information along.

The method of conducting this first National Championship in Australia is rather similar to that used for the very first National Bench Rest Championships in the United States in 1951.

While no conflict may arise over "World Record" claims as a result of this first national championship in Australia, since this competition is sponsored by a recognized national shooters' organization it is reasonable to expect that national championships will be continued in the future and that some program for Australian national bench rest record recognition may be adopted. Therefore it would seem desirable for the Australian and United States national organizations to keep in contact with each other and to work out details for consideration of "World Record" claims in the future.

P. H. T.

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NO BETTER THAN . . . . .

Not long ago, Kent Bellah ended one of his monthly discussions on handloading in GUNS magazine with the statement that "No gun is better than the ammunition that is fired in it." There should be no reasonable argument against that statement. In this writer's opinion, rifle and accuracy-wise, that statement could be just as truthfully be reversed to "no ammunition is better than the gun it is fired in." It is this writers' conviction, based on experience, observation and just plain reasoning, that ammunition of very superior accuracy capability fired in a rifle of mediocre accuracy will deliver no better than mediocre accuracy on the target.

An overwhelming majority of factory mass-produced rifles are designed specifically for hunting. The reason is obvious. Hunting is what an overwhelming majority of purchasers want rifles for.

The accuracy of mass produced centerfire sporter (hunting) rifles with factory loaded ammunition is generally adequate for the normal demands; shooting sizable game animals at moderate ranges. But with the exception of some outstanding individual rifles, from the target shooter's standards the accuracy of the average mass produced sporter rifle, as it comes from the factory box, is no better than mediocre.

The foregoing statements are not intended to condemn or belittle today's factory produced sporter rifles; their accuracy and general serviceability are adequate for the purposes they are intended and under today's economic conditions they are sound values.

It is this writer's opinion that any mass produced centerfire sporter rifle as purchased which, fired at 100 yards from rest under good shooting conditions, with factory and/or good handloaded hunting ammunition, will group 90% of its shots within a two inch extreme spread is a good one. In such a rifle the difference between good and poor ammunition will be evident but, when available in some calibers, really superior ammunition of target accuracy capability will not much improve the average accuracy, if at all.

It is generally conceded that in handloaded rifle ammunition the bullet is the most important component affecting accuracy. As with rifles, the overwhelming majority of commercial rifle bullets are designed specifically for hunting purposes. To the best of this writer's knowledge, U. S. factory produced bullets designed and made for superior target accuracy are available in only two calibers; .22 and .30. Fired in heavy, custom made rifles for competitive bench rest shooting, these bullets of 52 and 53 gr. weight in .22 caliber and of 168 gr. weight in .30 caliber have demonstrated important match winning accuracy, which means half-minute-of-angle or under **AGGREGATE AVERAGE** at 100 and 200 yards range. However, these same bullets in carefully assembled hand loads, fired in a GOOD sporter rifle, will show little if any improvement in the average accuracy of such a rifle. This I have experienced and seen demonstrated times enough that I am convinced that it can generally be considered as expectable.

Some experimenting with good components, carefully assembled in hand loaded ammunition, should permit any experienced shooter to determine the accuracy potential of a rifle. Frequently there are rather obvious hindrances to accuracy in a factory produced rifle as purchased. Eliminating them will usually improve obtainable accuracy. Aside from such obvious hindrances, no tuning, tinkering or what-have-you that the average rifle owner can do will make a two-minute-of-angle rifle deliver the one-minute-of-angle accuracy that too many people bandy about as commonplace accuracy for the rifles they shoot.

Western Wildcats
Prone Championships
"The Best Smallbore Match in the Country"*
A 4-day 6400-Point Aggregate!
Phoenix, Arizona **MARCH 3, 4, 5 and 6, 1966**
Shooters Choice of Awards:
CASH — MERCHANDISE CERTIFICATES — TROPHIES
Programs: GEORGE STIDWORTHY
Box 1363, Prescott, Arizona
***"An opinion expressed by many shooters who have attended previous Wildcat Matches.**

Any rifle shooter who is experienced enough to "call his shots" as he fires them should have the confidence to believe what his test shooting tells him of the accuracy of the rifle, or knowing that, of the ammunition he is testing. If the shooter goofs and gets a shot off badly (and few of us don't do that at one time or another) he knows it and can make proper allowances for his own faults.

I should probably close with the statement that "no gun or ammunition is better than the person who shoots them."

P. H. T.

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SPORTSMANSHIP EXEMPLIFIED

(An excerpt from an item in the December 1965 RICOCHETS, monthly news bulletin of the Phoenix Rod and Gun Club—Ariz.)

"In spite of problems with a bullet coming loose and letting powder get into the trigger, Speed Bellsmith fired a 100 in each of the 3 matches at 600 and 1000 yards at Black Canyon on Sunday, Nov. 21. His V count was 51 out of a 60 possible.

"Understand there were some squawks on technicalities, but Roy Dunlap of Tucson, with a score of 300-46, was the one to be most concerned. **He was the one who helped Speed get his rifle back into shooting condition."**

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THE ANATOMY OF FIREARMS

THE ANATOMY OF FIREARMS by L. R. Wallack is a rather elemental but quite comprehensive discussion of all types of sporting firearms, their component parts, their operation, ammunition and some simple ballistics information. It is written in a clear, simple style that people with a very limited experience with guns can understand and make use of.

There is little in the book that the experienced shooter doesn't already know but for inexperienced gun owners and users with an awakening interest in firearms and shooting it is a very good starting book—and that is exactly what it is intended for. P.H.T.

(Published by SIMON AND SCHUSTER, INC., 630 Fifth Avenue, Rockefeller Center, New York, N. Y. 10020. 320 pages, well illustrated. Price $6.95)

A NEW SITE-A-LINE BORE-SIGHTER KIT BOX

The Alley Supply Company, Sonora, California now have available a new sturdy moulded plastic container box for the Sweany Site-A-Line Bore-Sighter kits. The new container box is designed especially for the gunsmiths and gun stores which use the complete bore-sighter kits extensively, and for those people it is a convenience and time-saver over the folding Vinyl case that has been available.

The 4¼" wide X 6¼" long X 4" deep box has fitted and labeled holes for 16 bore-sighter rifle spuds from 22 rimfire through 45 caliber and a fitted space for the optical unit of the instrument. The hinges for the box cover, generally a weak point of plastic containers, have been specially designed for trouble free service and in break tests the boxes broke first at points other than the hinges.

While the containers were designed particularly for gun shops and stores, they are available to anyone who has and uses from several of the spuds to the complete set. The retail price is $7.50.

The Site-A-Line bore-sighters are a time and money saving necessity for the general gunsmith and permit gun stores that have no other service department to offer a bonus service to their gun and sight purchasers.

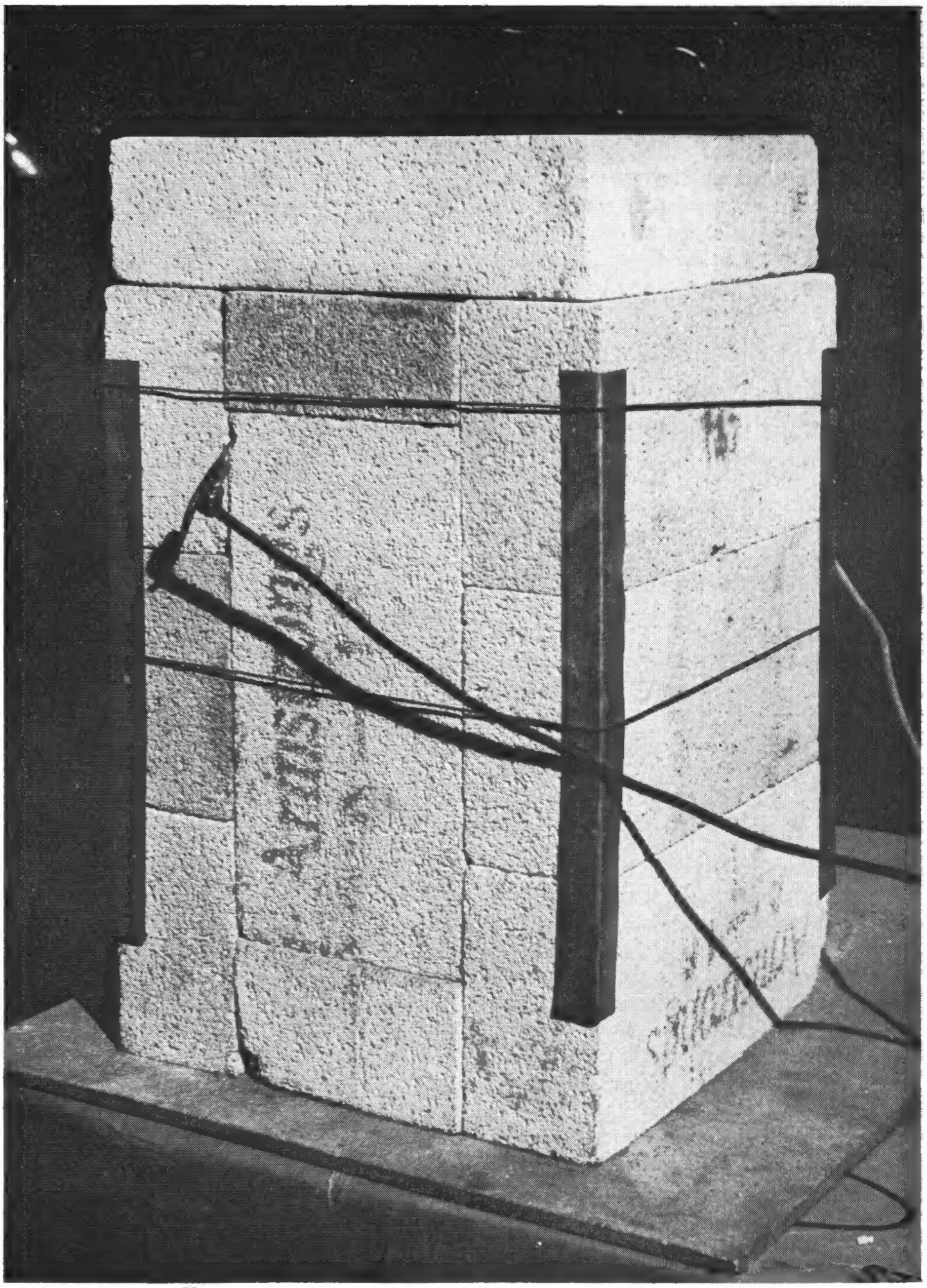
P. H. T.

A HEAT TREATING FURNACE FOR THE HOME WORKSHOP

By W. J. Purcell

Some one has said that the two most overrated things in the world are home cooking and amateur interior decorating. While taking no position on the merits of this thesis I would wholeheartedly add the usual home workshop methods of hardening steel. Most gunsmithing books make a quick pass at describing the heating to cherry red and plunging into water, mercury or other substances, followed by a table of tempering colors and a list of the carbon content of steels used from adzes to kitchen stoves. Shades of the ancient sword makers of Toledo who heated the blade in a charcoal brazier and hardened by plunging into the belly of a Nubian slave. Small wonder that these books describe the difficulties of spring making.

Modern technology and steels make such methods as outdated as high button shoes. Cherry red varies widely depending on individual judgment and is further affected by the amount of light in the shop. Modern steels have an optimum quenching range ranging from 100 degrees F. down to about 25 degrees F. Quenching outside this range increases grain size, decreases strength and seriously affects other properties. Because of cost and ease of construction and particularly because it best lends itself to a uniform temperature distribution an electric furnace is best suited to home construction.



Illustraton No. 1: Simply a pile of fire bricks held together by corner angles and wire. The two top bricks and three bricks on the right side were removed to show the interior.

Illustrations No. 1 and 2 show a furnace which has served me well for over thirty years. Simple in construction it is merely a pile of bricks with a heating element of Nichrome V wire. The bricks are a coarse textured fire brick of such soft consistency that they will crumble under fingernail pressure. Do not try to use the hard, yellow brick used to line fire places and other types of furnace. These bricks measure 2½" x 4½" x 9". Piled, as shown, the interior measures 4" x 4½" x 11". As originally built the height was 9", the length of one brick. The upper two inches was added to accommodate a heavy receiver. Because heat rises it was not necessary to add more coils at the top—the temperature remained uniform. If the extra height is not needed the two bricks at the top of the bricks holding the heating element may be eliminated and the side bricks rearranged. In its original form two layers of brick were used to provide added insulation but were later discarded as unnecessary. After an hour of use the exterior, with one layer is only moderately warm to the hand. Added insulation is not gained by the use of furnace cement between the bricks, in fact this cement is so conductive as to add heat loss. The furnace is top loading, the "door" being the two top bricks shown in Illustration #1. The top loading feature is desirable because the majority of the parts to be treated are long and thin (reamers, etc.) and warp less if suspended vertically. The crack between the two top bricks is convenient for holding the work by a piece of iron stove pipe wire. As shown in Illustration #1 the furnace is held together by sheet metal angles at the corners clamped by wire bands. If you have or can borrow a band strapper the job will be neater and more rigid. The perfectionist can build a sheet metal box, insulate between the furnace and the box with about 1 inch of horticultural vermiculite and have not only a more professional looking job but get almost 100% heat insulation.

As the heating element to be used consists of seventeen coils eight equally spaced grooves are scraped in each of the side bricks and one groove, as shown in illustration No. 2 in the bottom brick. The brick is so soft that these grooves may be scraped by running a round pointed instrument along a straightedge or they may be cut with a hack saw. They are cut to seat the coil to one half its depth. As can be seen they do not stay put very long, particularly if the furnace is run up to 2250 degrees F. as I have done a couple of times. Such temperatures require an atmosphere furnace as the steel is rapidliy decarburized in air at this temperature. These temperatures also reduce the life of the heating element and were the cause of the cracks noted in the rear and bottom bricks in Illustration #2. However, the cracks do not appear to affect performance. This furnace does work well up to 1850 degrees F. if the work is small (½" or under) and is preheated to about 1200 degrees before placing in the furnace.

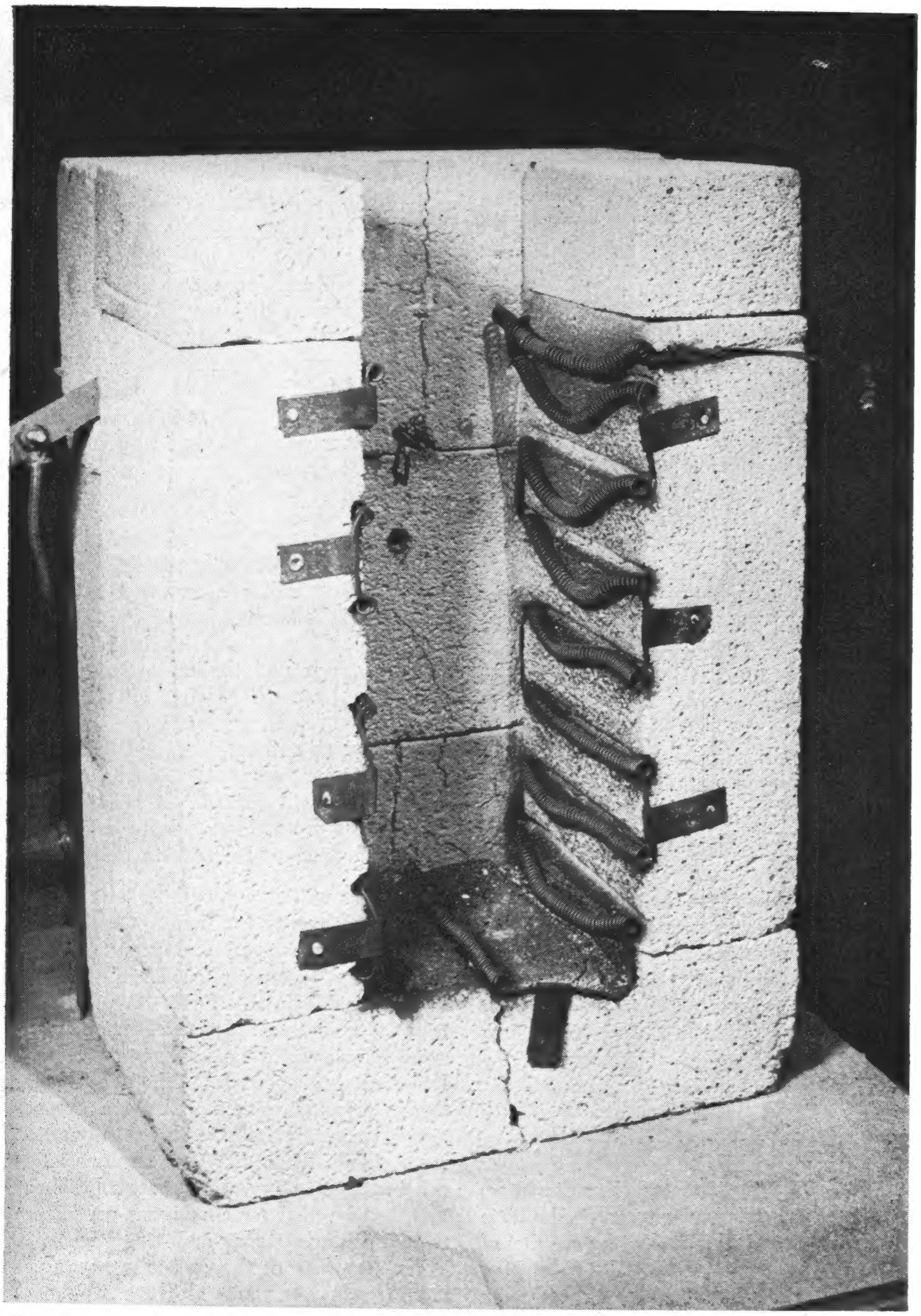


Illustration No. 2: Shows heating element and manner of installation. The element draws 1,000 watts at 120 volts. The cracked bricks are thirty years of tired old age.

The heating element requires 60 feet of Nichrome V wire, size #16 B&S (.051" diam.). This wire must be ordered from the DRIVER HARRIS CO., Harrison, New Jersey or from their warehouses at 5245 West Diversey Ave., Chicago, Ill., or 7016 Euclid Ave., Cleveland, Ohio. On the west coast the distributor is ANGUS-CAMPBELL INC., Tennessee St., San Francisco, Calif. and 4417 South Soto St., Los Angeles, Calif. Cost some years ago was about $7.00 a pound and probably not sold in less than pound lots. One pound is enough to make two sets of coils.

Fold back 6 inches of wire on each end of the 60 foot piece and twist tightly. This forms the lead out connection shown in the upper right of Illustration #2. If only a single wire were brought out here it would be unable to dissipate its heat and burn out. For this reason be certain that the sections of wire connecting the adjacent coils are not pinched between the bricks. The lead out in the upper left of Illustration #2 is a repair made with a piece of Nichrome ribbon because I got careless and covered a single wire. The twisted wire is best.

There is now 58 feet of wire between the twisted ends. Of this about 18 inches are required as connections between the coils leaving 56 feet 6 inches to be formed in coils. With 17 coils to be formed each coil will require 39.76 inches of wire. To avoid accumulated errors it is best to mark off the lengths required for coils and connectors before starting to wind. One inch has been allowed for the side connectors and two inches for the two bottom connectors. Starting at one end, next to the twisted portion wind the first 39.76 inches on a mandrel which will result in an outside coil diameter which falls between .260" and .280". Mandrel size will vary with winding technique and will be in the order of 5/64". Winding should be tight spaced and not exceed forty turns. Skip an inch and proceed to the next coil, continuing until seventeen coils are wound. Do not forget to leave two inches after the eighth and ninth coils. If measurements have been carefully made the seventeenth coil should end at the twisted end. As the winding proceeds disposition of the wound coils gets awkward. Best solution is to tape or tie them to the chuck holding the mandrel.

Illustration #2 shows the coils held in the grooves by folded pieces of nichrome ribbon tacked to the brick. Lacking the ribbon bend a piece of left over nichrome wire in the form of a hair pin and take one turn around the one inch connector at the bottom of the U of the hair pin. Bend the ends of the hair pin at right angles and push into the brick. Using this method it is advisable to use two clips for each connecting wire. The close wound coils are stretched to the width of the brick. Some bending and adjustment will be necessary to fit the coils in place.

Without an accurate device to measure temperature the furnace offers few advantages over heating in flame. The accepted instrument for this purpose is a pyrometer. This instrument operates on the principle that, if two wires of dissimilar metals are connected together at one end, as by welding, and this welded end is heated, an electric potential is produced across the cold ends. If an electric meter is connected across the cold ends its deflection, when properly calibrated, gives a very accurate measure of the temperature. The wires, suitably formed for this purpose, are called a thermocouple. In Illustration #2 the hot end of the thermocouple is shown projecting about ¾' into the furnace at the bottom edge of the upper, rear brick. While it is possible to assemble the materials and construct and calibrate a pyrometer the cost of the components so nearly approaches the cost of a completed pyrometer that it is advisable to purchase this unit. Recommended is Cat. No. 4616C Model C bench pyrometer available from Assembley Products Inc., 75 Wilson Mills Road, Chesterland, Ohio. This unit has a range of 0-2000 degrees F and was priced $36.95 in 1959. No attempt is made to describe an automatic temperature control as an accurate electronic control is complicated and plagued with the difficulty of finding a satisfactory contact making microammeter. I have found such a device unnecessary in practically every job I have encountered in-

Turn page please

cluding the tempering of a receiver at 1000 degrees if the oprator is willing to take some extra time in watching and manually controlling the temperature.

Designed to reach temperature stability (the temperature at which the heat loss equals the input) at about 1700 degrees, the furnace comes up to its most used temperature, - 1400-1450 degrees in about 15 minutes. At this point the walls of the furnace are at practically the same temperature as the atmosphere within the furnace. This is readily determined by noting that the tip of the thermocouple will disappear against the furnace wall. Small parts, such as a ½" reamer need not be preheated. Placed in the furnace when the furnace has reached 1200 degrees, they will be found to be at the furnace temperature when the pyrometer arrives at the quenching temperature. Larger parts, such as loading dies are best preheated. Again, if the treated part has reached furnace temperature it will be found that its color, matching that of the furnace wall, makes it practically invisible. If, using this check, it is found that the work has not reached the desired temperature when the furnace does, a few minutes operation of the on-off switch will allow it to catch up.

Lacking an automatic temperature control, pack hardening is possible by inserting an external series resistor in the furnace supply. This may be made from the same wire as used in the furnace or from wire salvaged from an electric heater. Fortunately, maintenance of pack hardening temperatures is not as critical as quenching temperatures. If the furnace is allowed to reach a stabilizing temperature and the voltage supply is reasonably stable this method has been found to be very satisfactory and has been used in drawing at temperatures above 500 degrees with excellent results. Parts to be drawn below 500 degrees are more easily drawn in the kitchen oven. A word of warning—oven thermostats are notoriously inaccurate and should be checked with a deep fat cooking thermometer (bulb type).

A word to the novice on steels. Avoid as a plague the use of odds and ends of unknown steel for any but the simplest jobs where quality is unimportant. Complete knowledge of the steel's characteristics is essential to proper heat treatment and a satisfactory product. All tool steel companies supply data sheets, free for the asking, on each of the various grades they produce. Many publish a handbook which may or may not be free depending on how well you can con the warehouse salesman. MACHINERY'S HANDBOOK, published by the Industrial Press, 148 Lafayette St., New York 13, N. Y. contains a wealth of useful steel information. Avoid the high speed tool steels unless it is planned to send the work to a commercial hardening shop. After years of using various steels the writer has settled on Allegheney Ludlum DEWARD as the most satisfactory steel for all around use in the small shop. Its greatest virtue is that it is practically non deforming, it is rare that a 6" reamer warps more than two thousandths. It hardens at 1400 degrees, low enough to prevent decarburization. While its use is not advised for long, production run, cutting tools, a chambering reamer from it will probably last a custom gun shop a lifetime. The same Company's OILGRAPH has proved excellent for bullet and sizing dies. These two serve practically every purpose in the writers shop. Most other companies produce comparable steels.

Although the directions given would indicate the need for exact compliance considerable tolerance is permissible. (The wire lengths are given to the second decimal only so that the sum of the individual parts will equal the whole length of the wire.) The arrangement of the bricks may be varied to suit convenience provided the brick area does not exceed that given. The brick area may be reduced by eliminating the top row of brick (2½") without adversely affecting performance. The number and arrangement of the coils may be modified if the total length of wire is unchanged and the space betewen the adjacent turns of the helical coils is not less than one and one half or more than four times the wire diameter.

I can think of no better closing than to say that if anyone constructing such a furnace has questions because I have not made any of the details clear I will be most happy to try to help. The mail address is W. J. Purcell, Howes Cave, New York 12092.

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BALLISTIC TESTING TECHNIQUES

ADVANCED Shooter Experimenters and handloaders often engage in ballistic test programs. Many make the results of their work available to others by publishing their data and conclusions. This exchange of information does a lot to further amateur understanding of shooting problems. Associates of E. B. A. have been active in this area of endeavor. Often these projects are of considerable magnitude, and the question arises how other shooter Sams can be expected to follow suit and solve their own problems by similar investigation. Sometimes these leaders are asked to pass along their secrets, the tricks of the trade or what may be called "the inside dope." Reference is somtimes made to popular press terminology such as "system evaluation" and "reliability assurance," and so on. Requests for advice are a normal thing.

Frequently the advice has already been given. Those asking have either not seen it, not recognized it as such, or feel that the problem requires a much more abstruse approach. There is a tendency to think the inside tracker has a lot up his sleeve he is not letting out. Depending upon how inside you are, you may be playing this up or down as the pitch may go. And so it may seem that some know much more than they'll admit, or that they stay smart by saying little. Actually knowledge is free except for the work of getting it. That price is paid by all.

When an expert in a field writes about his own area of knowledge he has obstacles to surmount. He must judge what the reader can absorb, accept or tolerate. Often he presents more than any reader will really utilize just to make the story a complete one for the record. Just as often trivial detail is omitted because to his mind anyone ought to repeat what to him is obvious. These minor points, or details, are just the things that any real doer will want to suit himself with.

Experts are not one day wonders. They have spent years learning the skills of their calling. To speak to a man in this class is to learn of the bank of knowledge that here exists. You'll not "pick his brains" in an interview, nor will the un-motivated gain his grasp by reading what he may have time to write. If, as Bacon said, you will read to weigh and consider, and then strike out on your own, the communication practitioners will prevail. It will take the average student as long to learn calculus as it took Newton or Leibnitz to develop it.

I have written a good bit about chronographs and how to use them. On the basis of distance from you and years of using these things, I presume that I can qualify as knowledgeable in this field. For sure I've tried to promote simple but effective screen systems, and where the reader is experienced I've had some success. Where a shooter thinks he might sometime have a chronograph, there is a strong tendency to question my methods. Not that I, or any one interested in such testing, would care a bit about that, but be glad somebody was coming up with forward steps and improvements. When it turns out the guy who hasn't yet got his feet wet wants to know who's got something up his sleeve to make it easier for him than you've got it yourself, you wonder then if we have more talkers than doers. And working in any field does mean work.

For chronograph testing I have long recommended mechanical frangible screens. And in particular a fineline pencil lead as a muzzle break screen (Scripto brand) and a Hollywood tape second, stop break screen. I have published photos of this set-up in at least four issues of three different publications for shootesr. Having both decades of experience in this work and many thousands of shots fired for record on chronograph projects, I have adopted this system because it offers me the greatest reliability for the dollar spent. One snowy day when my main concern was to get off the range and to my home, I ran 45 shots through my screens in just under one hour without any help what-so-ever and kept my notes. There was no problem of function, just how fast I could hop. And I made it back to fireside in good time.

Now, when some fine spring afternoon, I have a half-hearted once over "check my deer load" visitor tell me it is much too tedious to change those mechanical screens,—I ought to have photo cells or contact plates with gates in my chronograph to get a push button re-set, backed by no simple and reliable circuit info, but, of course with allusions to some guy working in space circuitry they know, and it ought to be much better another way, is it amazing that this just doesn't take? It is clear enough to me that photocells would have quit in that snow storm, and contact plate screens would have hopelessly shorted. I would have retired from range to kitchen and hot coffee, to venture forth a better day. A hotter day I'd not want to shoot 45/hr. for fear of heating the gun and changing the results.

The reasons why those who know their business follow their especial practice aren't communicable to those not already in an active pursuit of that form of ballistic testing. The point is that you can't learn to swim on the moon, not without enough dedication to study and work diligently, or to import water. To tell somebody how to insert a Hollywood tape into an alligator clip would sound and be over-zealous, asinine. BUT it is beyond any question whatever that, unless you do learn how to clip a contact on the screen, you'll fail to get consistent results.

CALIBRATION Of Chronographs is a point often raised. The use of ammunition of reputedly known velocity is put aside as inadequate. Checking of oscillator frequency with WWV signals is discounted by yet-to-be chronographers as only a partial check. An over-all procedure, good for any circumstance is sought. How the seeker of these methods would know a valid from an unacceptable result is the question neither posed nor answered.

When, as is often the case, calibration of other than counter chronographs is the point raised, we can only say: you'll use ammunition you feel you know the answer for, or devise your own system. I'd never try another scheme, not when I can buy counter chronographs at less than $500. and a lot less, too. Labs with every conceivable facility use standard lots of ammo as the court of appeal to check their daily work. To tell you all of the things these professionals do would stagger your imagination. Neither you nor I would ever get anything done in their routine.

Checking the oscillator in a counter chronograph is also often made to be a complicated procedure. If the guy who raises this sort of question used his brain to solve the very simple problem he'd see that for chronograph use this precision is ridiculous and unneeded. WWV signals are broadcast on standard frequencies that are many times the crystal oscillator frequency of the chronograph. The signals are decimal multiples, though, and so their harmonics will beat with the 100Kc crystal frequency of the chronograph. To perform this check at all you must have a receiver to tune in WWV. Loosely coupling the chronograph oscillator output with the receiver input will result in beating these signals with each other. Should any adjustment of the chronograph oscillator be needed, it is brought to as nearly a zero beat as you can hear. At this point the calibration is within less than one part per several million. It won't vary from this enough to matter for years. Anyone, though, who questions what method should be used doesn't yet know what to do. My explanation is based on knowledge he hasn't got. And unless he'll get it on his own such exact instruction could go on for months, chewing up pages of PS to benefit one guy a year. The general principle that a counter chronograph can be beat to WWV can inform most readers that calibration is simple and extremely accurate.

Edward M. Yard

My chronographs contain no gate circuits. Once the oscillator is matched to WWV, my five decade instruments can be field tested with a stop watch to avoid error to less than ½%, and practically to zero for the whole system. Since there are no gates the overall check is easily made at any time. Other designs made more complex, seeking convenience (and not necessarily achieving it) and conformance or price are not checkable with equipment the handloader would keep.

Actually gate and trigger circuits are not likely to malfunction intermittently. There is little reason to expect trouble. If it occurs, the error is usually large. The use of standard test loads is enough to spot it. Where it isn't, probable handloader facilities would be wholly inadequate to find out the reason. Using a scheme to properly test a chronograph would require an order of skill a good cut above that needed to use it. And the knowledge a

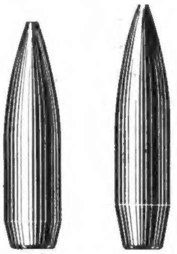
Turn to page 14 please

CAMP PERRY
1965

"In tough competition I depend on the consistent accuracy of SIERRA BULLETS."

John A. Clerke
National Civilian
Bolt Rifle Champion

Mr. Clerke won the National Bolt Rifle Championship at the 1965 National Matches with a new Civilian Record of 793 out of a possible 800 with 91Vs. This is an aggregate of scores fired in these 7 matches: President's Match, Coast Artillery Trophy Match, Scott Trophy Match, Air Force Cup Match, Navy Cup Match, Nevada Trophy Match, and Crowell Trophy Match. He won the trophy in the Crowell Match.



J. A. Clerke used Sierra's 30 caliber 168 grain International for short ranges and the 30 caliber 190 grain Matchking for the 600 and 1000 yd. matches. These are but 2 of 54 perfect shooting Sierra Bullets available at your dealers for target and game.

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National Bench Rest Shooters Association, Inc.

NEW BENCH REST RECORDS

Thomas E. Gillman of Hot Springs, Arkansas, shooting in a registered match on the John Zink Range near Tulsa, Oklahoma on August 21, 1965, set two new **LIGHT VARMINT CLASS** aggregate records.

His 200 yard aggregate has been officially judged as .4171 MOA. His grand aggregate record is officially judged as .3734 MOA.

His 200 yard record beats the .4411 MOA record made by Larry Beard on July 17, 1965. His new grand aggregate record beats those of co-holders Larry Beard (.3821 MOA) and Harold Campaul (.3832 MOA, shot in 1962).

For making the record Gillman shot his 22 Tom Cat cartridge in an 18½ inch Hart barrel, .850" at the muzzle with 14" twist, on his Gillman action. With his 15X Litschert scope the outfit weighed 10 lbs. 7 oz. Gillman gunsmithed and stocked his rifle. His load was 26.5 grains 4895 powder, 53 grain Sierra bullets and Remington primers.

....

The **LIGHT VARMINT CLASS** 100 yard aggregate record (.3046 MOA) which has been held by Harold Campau, Detroit, Mich. since 1962, was broken twice on the same day (October 2, 1965) at matches on widely separated ranges.

Shooting at the Col. Whelen Range, St. Louis, Mo., Thomas E. Gillman of Hot Springs, Arkansas, shot a 100 yard aggregate which was officially judged as .2971 MOA.

On the same day, shooting in a match sponsored by the South Creek Rod and Gun Club at Fassett, Pa., Omar Rinehart of Salem, Ohio, shot a 100 yard aggregate which was officially judged as .2896 MOA.

Gillman gets recognition for breaking the old record and Rinehart has been awarded the official certificate as holder of the present new record.

For his October 2nd shooting Gillman used a 22 caliber rifle, presumably the same outfit he used for his August record-breaking.

Rinehart shot a 222½ cartridge in Hart barrel, 19½ inches long, .900 inch in diameter at the muzzle with 1 in 14 inch twist, on a Remington action with Remington stock. Gunsmithing was by Yockey. With the Lyman 20X scope the outfit weighed 10 lbs. 7 oz. His load was 26 grains of Ball powder, his own Culver bullets and Remington primers.

FINAL MATCH OF SEASON AT CANTON, OHIO

Twenty-two competed in the final bench rest match of the season at the Canton-McKinley Rifle Club on November 6 and 7.

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• •

Six shot 250 point possible scores, Anderson winning with 21x. Davidson 16x, B. McMullen 15x, Mervis 14x and G. McMullen 14x. Anderson also had the winning group aggregate of .4061 MOA for the five 5-shot matches at 200 yards. Omar Rinehart dropped a point on score but tied Anderson's X-count, and also had second smallest group aggregate of .4906 MOA.

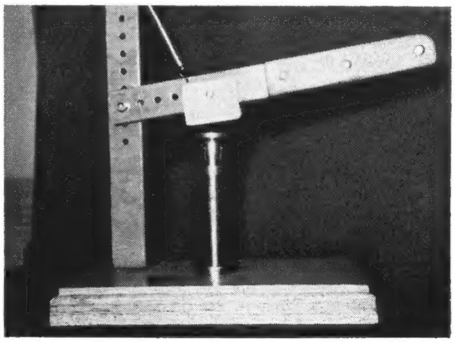
Anderson made his win with a 222½ cal. in Hart barrel on Hart action. Ten shot Remington 40X rifles, including second and third place winners.

EASTERN REGION NBRSA MEMBERS

NOTE

The 1966 Winter Meeting of the Eastern Region NBRSA will be held on January 29 and 30, 1966 at the Sheraton Hotel and Motor Inn, 111 East Avenue, Rochester, New York. There will be no "Group Feeding"—eat when and where you wish. There are three restaurants in the hotel from which to choose. The hotel is a five minute walk from the center of the shopping district and right near the Eastman Theater.

Contact John Collins, 95 Devon Road, Rochester, N. Y. 14619 (Phone 716-Be 5-5098) for reservation and rate card, and brochure of Hotel. Reservation card should be mailed to reach John Collins before January 15, 1966.

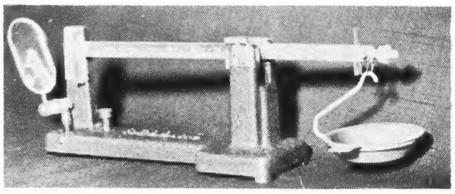


HOME-MADE ACCESSORIES

Paul E. Pickering, Georgetown. Mass., submits photos of some loading accessories he has made and describes them as follows.

The photo (above) is of a press I made for my bullet seating tool. The leverage on the long handle makes it much easier to seat bullets while sitting at the bench.

The base is about 6X9X1 inch mahogany. Steel uprights with a spring hold the handle up. A piece of hard plastic is fastened to the handle which comes in contact with the micrometer head on the seater. I found the time making the press well spent.



I have put a small inspection mirror on my powder scale (see photo). By moving the mirror to any desired position I can read the "zero" looking straight down on it. This saves much time weighing powder charges.

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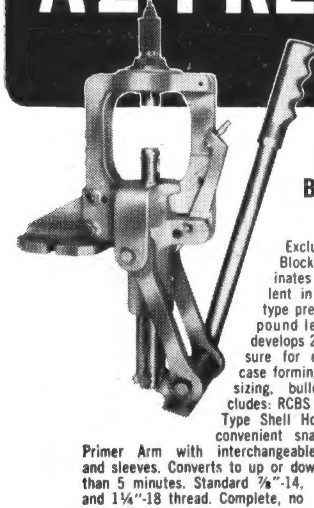

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SHOOTING IN MIRAGE AND WIND

By Paul O. Gottschall

(This very practical article is reprinted from the March 1958 issue of Precision Shooting and the information is just as valid today as it was then. Paul Gottschall is a two time winner of the Heavy Bench Rifle National Championship, was Heavy Varmint Class National Champion in 1962 and runner-up in 1965. P. H. T.)

Many other shooters have from time to time requested of me a "Magic Solution" for doping mirage and wind. Possibly I can be of some small help with a few observations.

First, I want to say; in some human pursuits we acquire exact knowledge and convictions, but in every attempt to dope the effect of wind and mirage on our shooting the opposite seems to be true. The more experience we have the fewer positive statements we can make and the fewer convictions do we have. I do not want these few words to appear as positive answers, but merely my own observations.

I have no quarrel with those fine riflemen who have the ability to judge the exact place to hold in constantly changing conditions, nor those who can judge the exact instant, at intervals of several minutes, when a shot will go into a small group. Such riflemen are in a class by themselves. As much as I would like to be one of them, I never expect to be.

These few words are for those who, like myself, are not blessed with this keen perception and must fall back on other methods.

I have a home range where wind and mirage always seem to be present and the following methods seem to work best for me, both at home and on ranges throughout the country.

As soon as we are permitted to take our place at the bench; study the flags, grass, bushes, dust and any other indication of wind speed and direction. As soon as we can be seated and can look through the scope, search for and study the mirage. Remember that on a sunny day mirage will be present in some degree unless wind is blowing it away.

If we have a nice day when the mirage is gently flowing in a constant direction, we have no problem and are not here concerned—we simply make sure we do not fire during any change. All of us used to wait until the mirage stopped all together for a perfect sight picture—this is a distinct mistake as the only thing that will clear away the mirage on a sunny day is wind, and it makes no difference where

Turn page please

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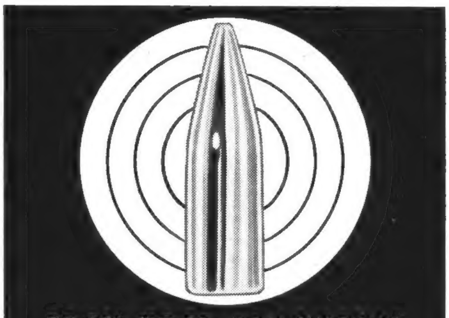

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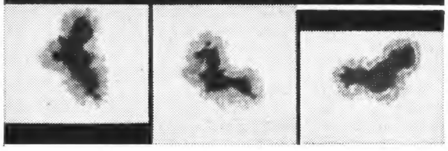

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At his work bench is Thomas E. Gillman, Hot Springs, Arkansas gunsmith, holder of national bench rest records in Varmint and Sporter rifle classes and 1965 National Champion in Heavy Varmint Rifle class.

Tom makes his own rifles for competition and chambers them for his "TOMCAT" cartridges. He is one of the very few top ranking bench rest competitors who uses commercial production bullets for all of his competitive shooting.

it comes from, be it a head wind, tail wind, right, left or quartering. Most experienced shooters on such a day simply try to fire all of the shots in a constant flow of mirage in one direction, and when it is constantly changing, try to determine the most likely direction during the first few minutes at the bench.

The beginner is faced with the problem of time. How to sweat out the time while those changes are going on and still get the required number of shots into the record target while this nice constant flow of mirage is going on. My answer is "Practice." Learn to manipulate the rifle as smoothly as possible. Try practice with fired empty cases if you can. They will at first seem very awkward, but if you learn to load, aim and snap down rapidly on empties you will surely go to town on loaded ammunition.

We bench rest shooters have ourselves created a time hazard that is in my opinion completely unwarranted. The rest, be it sand bag or mechanical, should be an aid to quickly return the rifle to a reasonably close alignment after each shot. By this I do not mean that the rest should return the rifle exactly to battery.

If you, as an individual, can not be happy unless your rifle will balance on the rest or sand bags precisely on aim without any hand pressure on the rest or sand bags, or body pressure on the bench, you will get no satisfaction out of these words at all. Endless fiddling with the rest and sand bags is for those few times when conditions are perfect. We are not here concerned with perfect conditions.

You can, however, learn to load, aim, correct final alignment by hand pressure on the sand bag or rear rest, or by applying body pressure on the bench, and fire in one swift gentle motion. You can make the best use of the time when the mirage flow is in your favor. You can learn to make instant decisions as to the apparent mirage flow. You can learn to fire your rifle 10 shots in 2 minutes, carefully aiming each shot under any circumstances.

Now we come to the really windy days when the wind blows away practically all of the mirage. Here is where skill in operation, quick decisions, quick aim and corrections will really pay off. On such days you can usually spot your bullet holes perfectly, and if you can fire your shots quickly you can use your last previous shot as a guide and compete with anyone.

I have found that on windy days I can do much better if I fire when the wind is quite strong, as there is much less difference in the average at such a time. When I try to fire my group in the comparative calm periods of a windy day it is much harder to avoid a complete let up, or even a reverse, with very sad results.

We still do not have a "Magic Solution" but possibly some may find these few words helpful.

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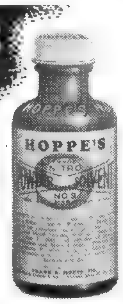

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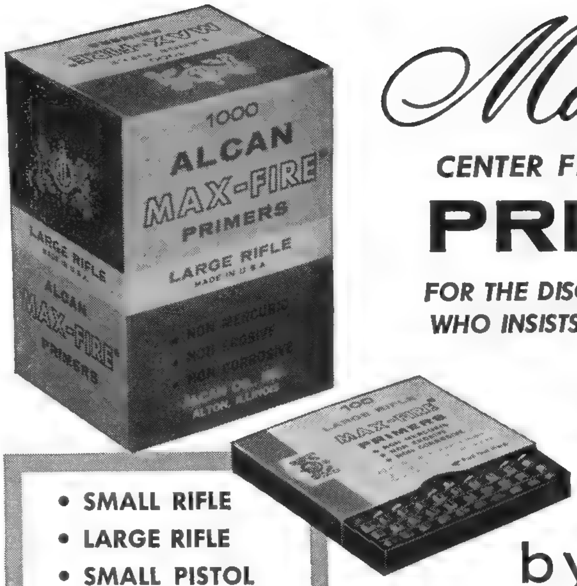

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CARTRIDGE CASE SEPARATION

In L. R. Wallack's very recent book "THE ANATOMY OF FIREARMS" he describes cartridge case separation in the chapter titled "Malfunctions You Can Fix." The method he describes for removing the headless body of the case left in the chamber is one that I have seen mentioned before; to insert from the breech a tap of proper size to lightly cut into the cartridge case body or neck, screw it in enough to get a firm grip and then push the tap and case out of the chamber with a cleaning rod inserted from the muzzle. That can be a ticklish, inconvenient chore and he warns that one can damage the chamber during this operation.

Cartridge case separation usually occurs with rimless rifle cartridges which headspace on the cartridge shoulder. It is caused by excessive headspace, usually with handloaded ammunition which by faulty adjustment of the resizing die has had the cartridge shoulder pushed back a bit in the resizing operation and thereby shortening a bit the length of the case body. In firing, the blow of the firing pin drives the case forward until stopped by either the case shoulder seating against the shoulder in the rifle chamber or by the extractor hook. The expanding gases force the walls of the cartridge case against the chamber walls for a normal friction grip, but without support at the rear the base of the case is driven back against the bolt face and the cartridge case is torn apart just forward of its solid head. When the action is opened only the head of the case is extracted while the body of the case remains in the chamber—and there's no tail to pull it out by.

When I had my first case separation I suspected the reason for it. Since there was no evidence of excessive pressure I reasoned that the cartridge case should have contracted from its tight grip on the chamber walls as in any normal firing and therefore should extract with normal ease—if it could be gotten hold of. I guessed that a normal snug fitting dry cleaning patch on a rod inserted from the muzzle might provide friction enough in the cartridge neck to push it out of the chamber. When tried it worked as hoped for. With the very few case separations I have had since then I have used the same method of removal, with success each time. So, at least in some cases, removal of the headless case without any damage to the rifle chamber is no worse than a nuisance.

P. H. T.

• • •

There are roughly 20,000 federal, state, county and local firearms laws and ordinances on the books NOW. Despite this record number, some people want more laws.

President Johnson said: "I think we must be very careful to see that we do not punish innocents in this country while we are trying to protect all of our people and that we do not hurt those who through no fault of their own could be damaged without any real reason," on April 1, 1965, referring to proposed Alabama boycotts.

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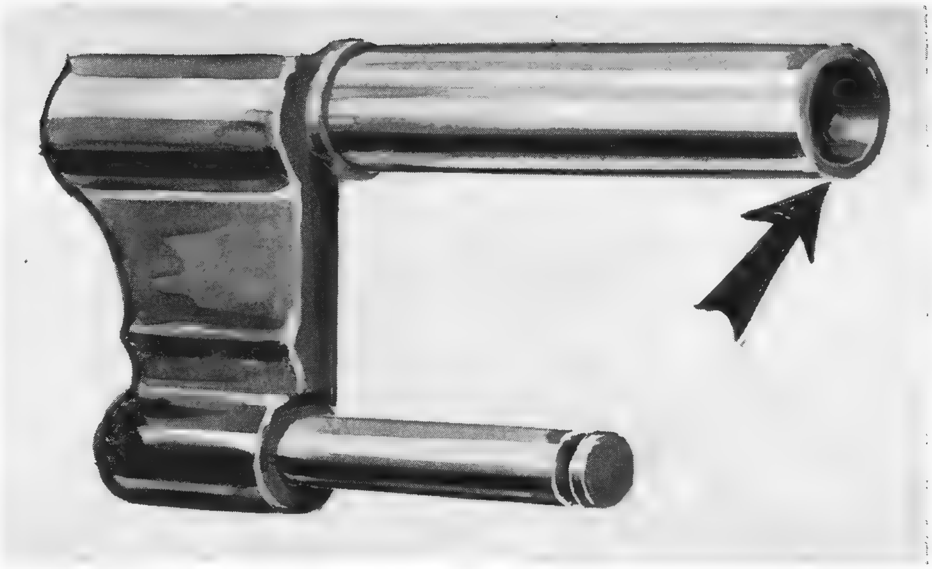

Arrow indicates point on end of yoke where thrust wear occurs. A little washer dropped into the center hole of the cylinder compensates for this wear and restores the cylinder to its original position.

YOU CAN'T BUY THEM

By William E. Peterson

As far as I know, no gun shop has them, or has even heard of them. They are little thin rings of shim stock, .004 thick, .383 outside diameter, inside diameter .070 less—only .313. Frail little things, but worth actually more than their tiny weight in gold when you need them.

The need for these little rings arises among revolver shooters at a certain stage of wear in a much-used revolver—that point when the front face of the cylinder begins to rub against the back end of the barrel. There is never much clearance here anyway, and there shouldn't be either, but that critical clearance slowly gets beautifully less under usage, until the cylinder begins to stick in its rotation, and the action develops rough spots that were not there before. The usual result of this is that you take the works out and start stoning on the action—unless you are fortunate enough to note the faint score marks on the front end of the cylinder, whereupon a great light breaks over the scene and you realize that the trouble is caused by the cylinder rubbing against the rear end of the barrel. At this point it is almost instinctive to put the gun in a vise, take a good grip on a file, and start shortening the barrel at its rear end until it doesn't rub any more. All wrong of course. The only right way is to compensate for wear at the point where it occurs—at the end of the hollow tube, part of the yoke, upon which the cylinder revolves.

That is where this insignificant little washer comes in. You can't buy them, but I have obtained a few from a friend who makes them, Harold W. Goff, of Lloyd Harbor, Huntington, N. Y. shooter, development engineer, inventor, precision machinist. Friend Hal diagnosed the trouble, figured out the remedy, and made a precision die set to stamp out the little washers which replace the wear at the critical contact point between yoke and cylinder. I have found them invaluable in three of my much-used S & W revolvers—.22, .38, and .45.

This man Goff, be it known, was one of those who worked out the present dial telephone. Along about the time when we were still telling the telephone operator what number to get us, I remember seeing some of the discs with holes around the rim, discarded as imperfect and given to his young children to play with. He was always coming up with something new. Once he arrived at the range with a revolver to which he had added a small lever, placed on the side of the frame, under the thumb of the gun hand. Downward pressure of the end of the thumb cocked the revolver without the change of grip and finger acrobatics necessary in usual thumb-cocking. During World War II he was very busy, but at what he would never tell us. Something deadly, no doubt. At last accounts he was putting the finishing touches on some sort of linkage arrangement enabling a rower in a boat instead of facing to the stern and getting a crick in the neck trying to see where he was going, to face forward while rowing in the usual way. Fly fishermen particularly should be interested.

Getting back to the original theme, those little washers not only prevent rubbing between cylinder face and barrel end, but also perform another important function. They prevent misfires. As the cylinder bearing wears under the forward push of the little hand which rotates the cylinder, said cylinder moves a corresponding distance away from the firing pin, thus lessening the force of its blow, particularly if the firing pin has become shortened through wear, as it usually has.

There is also a further unpleasant effect of this wear, which I discovered in shooting a .22 S & W revolver. Being a double action adherent, I do not like to put

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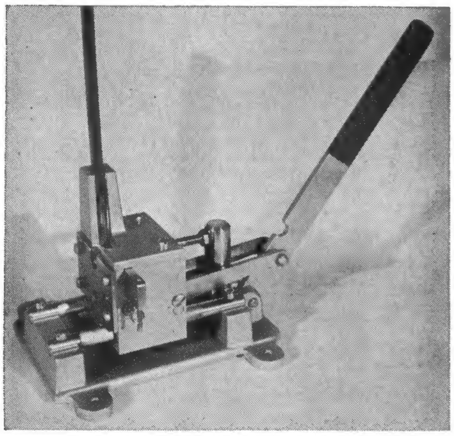

A rapid, efficient tool that will automatically insert primers with great accuracy in both rifle and pistol cases.

Each shell holder will handle two sizes of case heads.

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Standard shell holder for .38 Spl. and .30-06. Extra shell holders (two cal.) for $2.00.

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THE GUN CLINIC
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more tension on the main spring than will result in a pull of over eight pounds. This gave me misfires, and it was some time before I realized that there was a sort of pattern in their occurrence. In every five shots, the first would invariably fire satisfactorily, and the second would fail. I experimented by squeezing five cartridges slightly out of round, so they were a press fit in the cylinder. No misfires. Repeating the experiment several times confirmed it. This demonstrated that as the cylinder creeps forward and away from the face of the frame, it provides space for the unfired cartridges to bounce backward a few thousandths out of the cylinder, under the shock of explosion of the first cartridge. Thus the falling firing pin must first push the cartridge home in the cylinder, then dent it satisfactorily. If you don't think this matters try hammering a nail into a board held an inch above a solid base. You can't get a good sock at it. Part of the force of the blow is dissipated before it really does any work. In the gun the little washer holds the cylinder back where it belongs, so there is darn little clearance between frame and head of cartridge, resulting in a solid blow of the firing pin every time.

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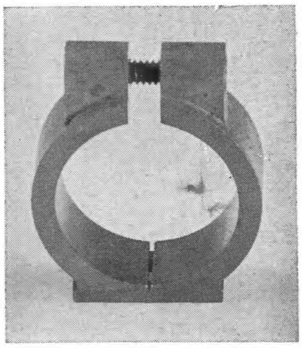

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A NEW MACHINE GUN

By SP5 Jim Baker

(A news release from the Public Information Division, United States Army Infantry Center, Fort Benning, Georgia.)

Fort Benning, Ga., Dec. 13, 1965—An old man with sideburns down to his mouth, a handshake like a vise and a .45 caliber pistol on his belt came to Fort Benning recently to show military officials his latest weapon idea.

David M. Williams, better known as "Carbine" Williams, was a fiery and hard-bitten man of 65 who stood before a contingent of Fort Benning soldiers and showed them his latest weapon—a machine gun that fires hardware-store ammunition at the rate of 2,000 rounds per minute.

Major Gen. Robert H. York, Fort Benning commander, was on hand to try out Carbine's new weapon and expressed his interest after sitting down behind it to squeeze off a couple of belts of ammunition.

Also on hand to hear about and see the weapon were the heads of the post's two testing ageneies, Col. Phillip Hooper of the Combat Developments Agency, and Col. James Muir of the Infantry Board.

Williams told the audience at Hook Range that he had developed the weapon in response to the need for a weapon to stop the Communist "human wave attacks" effectively.

The 2,000 round per minute rate of fire is faster than any gun of its size and type.

Williams explained that because of the gun's small caliber, it can be fired indefinitely with no appreciable rise in its heat.

In the past, there always has been a problem with machine guns becoming overheated when fired for prolonged periods at such high speeds.

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The "floating chamber" principle which has revolutionized semi-automatic and automatic weaponry since World War II is Williams' invention, and it is this principle which allows his newest machine gun "to obtain the maximum operatng energy from a small cartridge."

He says his finished model as he sees it "will weigh less than nine pounds" and be capable of being fired from the shoulder as well as a tripod. It will have a total length of 20 inches, he said.

The gun fires regular "long rifle" .22 caliber cartridges.

His combat model would fire the more lethal magnum cartridge.

He said the gun would have an effective range of 300 yards, "ideal for the human wave attacks in Vietnam."

Turn page please

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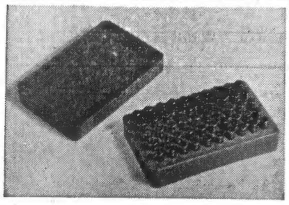

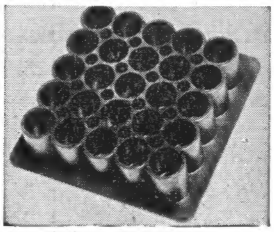

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Ballistic Testing Technique

handloader should have to use a chronograph intelligently in his load development work is something a non-user will not likely have.

If there are any tricks, they are the unpopular type. Care in everything you do is important. ALWAYS measure the distance between screens when you start, in mid-test and when you stop. USE a five decade counter chronograph, and field check function with a stop watch. Fire known ammunition in every test run. At the first sign of improper results, find the cause. A lot has been written about using chronographs, quite a bit by me, and most practical points short of you doing it yourself are well covered already.

The fundamental technique in ballistics, as it is in any field, is to get to work and find what you can. As soon as learning allows, begin your practice. Where one picture is worth a thousand words, one experience is worth more than mere pictures. Get your feet wet, work out your own special problems, tell us of your results. There is a lot in print, quite enough to start any serious experimenter on his way.

Edward M. Yard
Experimental Ballistics Associates

New Machine Gun

"With two or three of these in a defensive position you could really stop a whole bunch," he added.

Williams, the inventor of the World War II carbine from which he got his name, says one of the chief advantages of the new weapon is the light weight of the ammunition.

"Five hundred rounds weigh less than a pound," he added.

Soldiers could carry much larger amounts of ammunition than they can now with the much heavier NATO ammunition fired by the M-14.

Williams estimates that with the speed of 2,000 rounds per minute, most soldiers fired upon by his weapon would be hit twice before the gun could move on to other targets.

Williams has no idea what it would cost to produce his machine gun since his prototype model was handmade in his Godwin, N. C., gun shop.

Ross E. Beard, a Camden, S. C., gun collector, says Williams even makes his own tools to manufacture his guns.

Beard, who is writing the biography of Williams, said the inventor holds 59 major patents on his guns and gun mechanisms.

Making guns is nothing new to Williams. He made his first when he was 11 years old. It featured all wood construction— even the barrel was wood-fired black powder and buckshot.

Carbine carries a .45 caliber pistol "loaded with armor-piercin' stuff." When asked about the armor-piercing ammunition, he replied, "Wouldn't want no one shootin' at you from a car and not be able to shoot back."

For Williams, if he can sell the Army on his new machine gun, there'll be plenty of opportunity for U. S. Infantrymen to shoot back.

• • •

In the U. S., 168 policemen were murdered the past four years. Of those people involved in the murders, 79% had criminal records.

More money is poured into the American economy by shooting enthusiasts than any four spectator sports combined.

• • •

MOVED TO FLORIDA

One might be tempted to paraphrase a bit and claim that "Old shooters never die—they just move to Florida." Chris Westergaard has joined the already quite large group who have done just that—at least for the winters.

When sending in his subscription renewal, Chris mentioned that he expects to take in all the Florida Mid-Winter Matches and that this will be his 64th year of competition shooting. He started his competitive shooting career and made some outstanding shooting records in the offhand Scheutzen matches in the early 1900's.

P. H. T.

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FOR SALE: 22 caliber HART barrel blank, 1 9/32 inches X 30 inches. Price $45.00. W. Tardy, 12 Fay Park Dr., North Syracuse, New York.

THE BULLET'S FLIGHT
From Powder to Target

THE BULLET'S FLIGHT From Powder to Target by Dr. Franklin W. Mann is "A study of rifle shooting with the personal element excluded, disclosing the cause of error at the target." The book, first published in 1909, contains a record of the meticulous and original experiments conducted by Dr. Mann during the period 1894-1908. It contains a great many illustrations which help clarify the text. The information in the book is presented in such a manner that a knowledge of higher mathematics is not required to understand it.

The greater part of Dr. Mann's experiments were with black powder rifles and lead bullets but many of his later ones were made with the early smokeless powder and jacketed bullet rifles.

The original printing of the book (in 1909) became exhausted and it was "out of print" for some time. In 1942 the Standard Printing and Publishing Company of Huntington, W. Va. published a reprint of the book (the copy of the book that I have had is of this edition) and that has apparently become exhausted or very scarce. Now, the Ray Riling Arms Books Company, 6844 Gorsten St., Philadelphia, Pa. 19119, has made another reprinting of the original book which should make it available for some time to come. The price of the book is $9.95. This new edition has a five-page introduction by Homer S. Powley.

While the BULLET'S FLIGHT is not a "popular" book for light reading entertainment, the two reprintings of it are a pretty true indication that it does contain information which people with a real interest in rifle ballistics and performance do want for reference.

P. H. T.

• • •

METROPOLITAN RIFLE LEAGUE MATCH

The first of the Metropolitan Rifle League 100 yard indoor rifle matches for the season was fired on the II Corps Armory range in Brooklyn, N. Y. on November 14th with 60 shooters competing. Two 40 shot individual matches were fired.

In the first match 10 fired 400 possible scores, the top five places going to F. Boyd 400-35x, E. Clausen 400-33x, F. Briggs 400-32x, S. Tekulsky 400-32x and A. Battisto 400-31x.

Thirteen fired 400 scores in the second match, A. Rosenblatt winning with 400-35x, followed by W. Heil 33x, F. Boyd 32x, H. Stone 31x and R. Triggs 29x.

Only three made two-match aggregate scores of 800; F. Boyd with 67x, S. Tekulsky 58x and R. Triggs 57x. A. Rosenblatt scored 799-69x, F. Briggs and H. Stone both 799-64x, and E. Clausen and A. Battisto each had 799-63x.

A second match on Dec. 12th, same place, same course of fire, had 69 competitors.

The first match had ten firing 400 possible scores with W. Ritchie, F. Boyd, J. Lantelme and A. Rosenblatt leading, each having 32 X's. In the second match there were again ten firing 400 possible scores. E. Clausen and A. Rosenblatt leading, each with 33 X's. W. Tomsen had 32 X's while R. Leslie and R. Butler each had 30 X's.

Three had possible 800 aggregates for the two matches with A. Rosenblatt 65x, J. Lantelme 61x and F. Boyd 58x placing in that order. R. Triggs with 798-69x had high X count and W. Tomsen with 799-67x had second high X count.

(Editor's comment: For this two 40-shot match aggregate, eight had numerical scores of 799 and the next ten had 798 scores. This makes even the MRL 12% reduction of the 100 yard decimal target appear just a bit ridiculous for this type of target shooting.)

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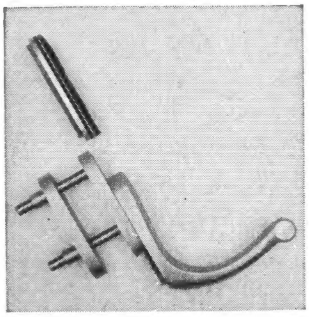

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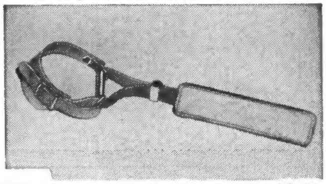

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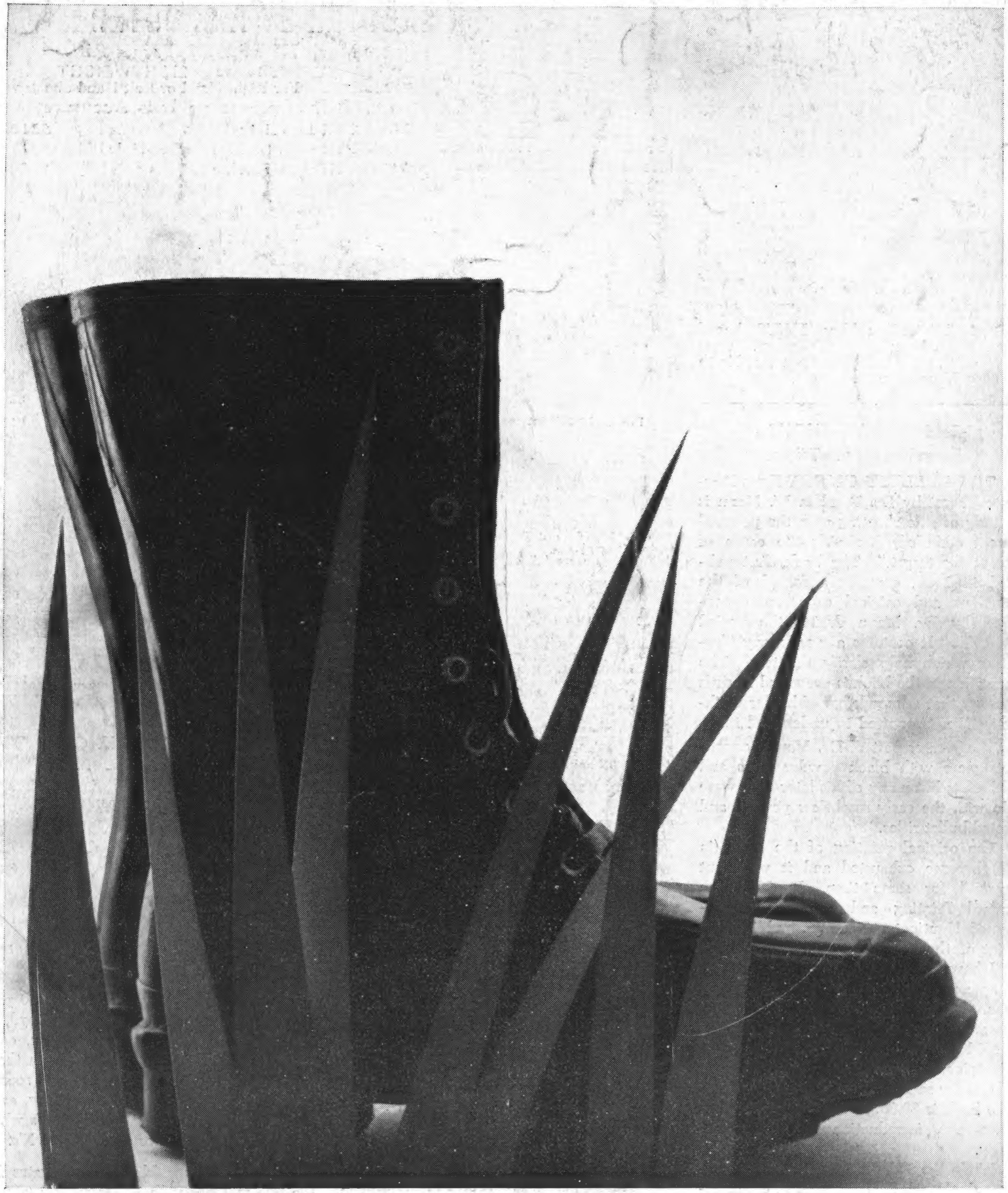

Put a senator in your shoes.

Or state legislator or local councilman.

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